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Sustainable Entrepreneurship Project

The Development of Action Competence for Sustainability – a longitudinal study with Vereniging Circulair Friesland

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ABSTRACT

Strongly demanded by science and society, organisations need to take action and transform their way of doing business into more sustainable ones. Therefore, they need to find ways to empower employees so they can become change agents for sustainability. Focusing on the development of action competence for sustainability, involving willingness, confidence, and ability to act, this paper investigates if and how sustainability training can represent one effective way to educate professionals and equip them to take critical action in the future. Based on pre-and post-training questionnaires as well as semi-structured interviews, this longitudinal study examines the development of eleven participants in a two-day training. The study results show that sustainability training can support the development of action competence for sustainability. By combining content and reflective elements, such as guest lectures and discussions, and providing a hands-on framework to get the participants into action, the training fosters the development of action competence. Apart from that, the group composition, including different starting levels and positions, and external factors such as family and friends or the current market situation, can influence the development of action competence. The study proposes an enhanced model for future training programmes that would further facilitate the development of action competence for sustainability.

Keywords: Action competence for sustainability, education for sustainable development, change agents for sustainability, sustainability training, training design

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1. INTRODUCTION

As the latest report of the Intergovernmental Panel on Climate Change (IPCC) (1, p.1) states there is a "rapidly closing window of opportunity to secure a liveable and sustainable future for all". Not only this report but also actual natural disasters along with further forecasts, demonstrate that effective climate action is urgently needed. Even though technological and policy solutions for transitioning societies exist, effective action is still lacking (2). So far, the majority of sustainability science has focused on the "external world", including ecosystems, economic markets, social structures, and governance dynamics (3). This approach involves, for example, regulatory shaping, social nudge, and economic incentives as a way to transform behaviour towards more sustainability (4). In contrast to this, the inner dimension of reality, hence the inner world of individuals, has widely been neglected (3, 5). The inner world consists of emotions, thoughts, identities, and beliefs which "are fundamental to the solutions of the world's greatest challenges" (3, p.208). Ives et al. (3) also argue that the failure to transform human behaviour towards sustainability by addressing the inner world is the reason why solutions to pressing global issues are thus developed but oftentimes fail to be implemented.

Aligning, a new stream of research emerged lately focussing on how to educate and enable individuals to contribute to sustainable development (6, 2, 5). Studies point out that sustainability requires a reorientation of education and new pedagogical ideas (7) including more experimental, innovative, and whole-person approaches (8). By providing guidance and comprehensive information, the concept of Education for Sustainable Development (hereinafter ESD) promotes the development of values, skills, and attitudes necessary for leading to more sustainable societies (9). Although ESD embraces multiple competencies, this study focuses on the development of taking action in particular, as it is proposed to be "the ideal goal of ESD [since it] empowers present and future citizens […]" (10, p.743) to tackle today's challenges. Generally, action competence

relates to “the development of understanding competence and skills that enable a person to take critical action” (11, p.1). With regard to sustainability, action competence is the ability to assess solutions to achieve sustainable outcomes (11).

While most research on fostering action competence has so far focussed on pupils and students (5), professionals are also an important group to think of (12). Although organisations and businesses are a big lever for systematic change (13), the literature on professionals and how they can learn to take action in their immediate work context is rather limited (14–16). Therefore, the study aims to shed light on the development of professionals, also referred to as change agents for sustainability (12), with regard to their action competence by answering the following research question: *How can training programmes for professionals support the participant’s development of action competence for sustainability?*

To answer the research question and contribute to the literature on education for sustainability, a training offered by Vereniging Circulair Friesland (hereinafter VCF) is investigated. VCF is an association operating as a network organisation in the Netherlands and working towards the goal of creating “the most circular EU region in 2025” (17, p.1). Besides campaigning and involvement in various projects, the organisation offers trainings for professionals about the circular economy. Representing a good example of sustainability education, the programme about transforming business operations towards circularity is considered to be a fitting study subject.

The paper is structured as follows: first, a literature review including the concepts of education for sustainability, the development of action competence, and organisations’ transformations toward sustainability will be presented. Together, this builds the theoretical framework of the study and highlights the research gap. Second, after providing an overview of the methods applied, the data analysis and the derived findings are presented. Subsequently, the findings are put into context in

the discussion section. A conclusion sums up the work and points out limitations and recommendations for future research.

2. LITERATURE REVIEW

2.1 Education for Sustainable Development and the need for action

Individuals play a major role in tackling today's problems and creating a more sustainable world. They require knowledge, values, and attitudes that empower them to do this (9). Education, therefore, is a crucial factor that is reflected in the increasing research interest (18, 19). Education can develop the capacity (I) to think critically, creatively, and ethically in appraising societal and environmental problems and (II) to act upon sustaining and enhancing the environment (20). Good education serves three main purposes: qualification, socialisation, and subjectification (21). Qualification provides learners with knowledge and skills to act, socialisation integrates them into society, while subjectification aims at supporting them to become autonomous and independent (22).

In line with the subjectification approach of education, the ESD concept of UNESCO aims to empower "learners of all ages to make informed decisions and take individual and collective action to change society and care for the planet" (23. p.1). Moreover, the subjectification model enhances political agency and critical citizenship (21). With this, ESD follows the call for paying more attention to action (24). As part of the global *Agenda 2030 for sustainable development*, UNESCO focuses on five core areas: "(I) advancing policy, (II) transforming learning environments, (III) building capacities of educators, (IV) empowering and mobilizing youth, and (V) accelerating local level action" (23, p.1). With its holistic, pluralistic, and transdisciplinary approach (18), ESD is also understood as a lifelong learning concept. This means that all educational institutions, from preschool to tertiary education, in informal or formal settings, are included (9). Moreover, ESD

strives for a shift from teaching to learning. Only "action-oriented, transformative pedagogy, which supports self-directed learning, participation and collaboration, problem-orientation and inter-and transdisciplinarity" (9, p.7) makes the development of key competencies for sustainability possible.

Competencies are complex combinations of knowledge, skills, values, understanding, and attitudes (25). UNESCO adds to this by defining competencies as an interplay of knowledge, capacities, skills, and motives (9). More specifically, key competencies are proposed to be essential for learners of all ages worldwide and can be seen as transversal, multifunctional, and context-independent (9). Among other studies, Wiek et al. (6) indicate the following competencies as key competencies for sustainability: system-thinking competence, anticipatory competence, interpersonal competence, normative competence, and strategic competence.

2.2 Action competence for sustainability

Being part of strategic competence, the concept of *action competence* has been developed in health and environmental education research in the late 90s (26). It entails developing students' "intellectual capacity and motivation to take an active part" in solving (future) problems (27, p.429). Moreover, competence in the context of sustainability is about evaluating situations and making "informed decisions for a spectrum of actions" (16, p.11). Seen as a critical, reflective, and participatory approach, by which the developing adult can cope with future environmental problems, action competence can be categorised into three interconnected subthemes: (I) the *willingness,* (II) the *ability*, and (III) the *confidence to act* (16, 26). The *willingness to act* is expressed through motivation and commitment to act (22). This often implies self-motivation, because sustainable actions are typically not "recognised by the formal reward system" (28, p.223). Moreover, the willingness to act entails drive and courage (22). *The ability to act* requires individuals to possess theoretical and practical knowledge about sustainability and related topics

such as impacts on the environment or human behaviour (22, 29). This knowledge should be coherent and flexible which means that knowledge from different fields "needs to be understood as an interconnected whole" (22, p.8) while being able to adapt when new knowledge emerges (22, 30). Lastly, the *confidence to act* can be described as higher confidence in a person's ability to take action and reach the desired outcomes (22). This implies that people believe that the planned action, if well performed, will lead to solving the issue at stake (APPENDIX A).

Since ESD is striving for enhancing individuals' action competence (31, 22), the question arises of how to achieve this. In general, the literature states that competencies cannot be taught, they have to be developed by the learners themselves (9). Therefore, education should ensure that it provides the best possible support, including learning content and methods (32). To nurture individuals' action competence, studies in the context of schools and universities highlight that different aspects are important (33, 34, 11, 27, 18, 19, 35). In their framework, Eames et al. (36) identified six key processes which are considered to be necessary to develop action competence. The following table contains a list of all processes and a summary of the suggestions to support them.

Process	**Literature suggestions**
(I) Developing knowledge and understanding of both conceptual and practical sustainability issues	• Combining content with reflective learning approaches (34) • Asking questions, stimulating classroom discussions, and initiating role plays will also enhance critical thinking (37, 33) • Critical thinking: Efficient use of skills for taking informed decisions (35); considered to be important for developing action competence (27)
(II) Developing a vision for a sustainable future and exploring	• Guest speakers or lecturers can increase individuals' confidence to act as they inspire followers and encourage imitation (34)

alternatives for change in the present	• Listening to success stories can create hope, especially important for younger people (38) • Guest speakers can become role models and serve as a source of empowerment (24)
(III) Developing the ability to think systematically	• Striving for interdisciplinarity in both formal and informal settings (39) by working in groups and exchanging with others (34) • Using games, hence approaching the issue at stake playfully, can also facilitate system thinking (18)
(IV) Developing the ability to plan and willingness to take effective action	• Practical exercises help to increase students' understanding of the complex issue of sustainability and to develop action planning skills (34) • Action planning: identifying stakeholders, communicating with them in a participatory manner, setting goals, and recommending appropriate actions (35) • Practical exercises also entail real-world experiences, which highly influence the level of commitment, hence the willingness to act (33)
(V) Gaining experience on sustainability issues	
(VI) Developing critical reflection abilities about one's experience	• Providing room for self-reflection (34)

Table 1:The six processes to develop action competence and corresponding suggestions to support them

2.3 Transformations of organisations towards sustainability

Since organisations constitute an impressive force in society, transformations of organisations towards more sustainable practices are necessary and long demanded by science, practitioners, and society (40, 41). Sustainable practices include, for example, taking a long-term perspective, considering the interests of a range of stakeholders, having a strong shared vision, or developing employees continuously (41). The steps for transitioning to a sustainability-driven organisation can be outlined utilising Kotter's organisational change model (1996) (41). After establishing a sense

of urgency related to climate change, ethics or stakeholders, the transformational process continues with forming a guiding coalition, comprising so-called change agents from all organisational levels. A change agent is an individual "responsible for initiating, sponsoring, directing, managing or implementing a specific change initiative, project or complete change programme" (42, p.26). In the context of sustainability, change agents take responsibility for social and environmental issues by motivating and inspiring others to leave old paths, initiating sustainability-related projects, and integrating sustainability criteria into business processes and structures (12). Continuing the change process, the newly formed coalition creates a future vision and communicates this to the organisation (41). Followed by the creation of short-term wins and consolidation of improvements, the change process ends with the institutionalisation of new approaches into the organisational culture. To do this, and hence effectively implement sustainability, a consensus has emerged that change agents need specific competencies (43). Because organisations require ideas, knowledge, energy, and creativity when transforming towards sustainability, organisations need to find ways to empower change agents to take critical action and do things differently (41).

However, even though organisational change theory including the qualification of change agents recognises that sustainability education should not only be dealt with in schools and universities but also in organisations, only a few studies are presented in organisational contexts (41, 40, 44).

2.4 Sustainability training as a path to transform organisations

A high level of action competence is needed to foster organisations' transformations towards sustainability. Being part of the organisational culture, sustainability training is one way to educate employees (44) as it can positively influence "employees' propensity to act sustainably at work" (16, p.1). Sustainability training can be seen as an experimental safe space as it provides room for

self-reflection, experience, and practice (2). Thereby, employees' willingness, ability, and confidence to act can be developed (22).

Effective sustainability training for professionals provides certain contents, methods, and techniques which positively influence the acquisition of action competence for sustainability (45). The study of Schröder et al. (16) highlights that training should start with conveying knowledge about sustainability problems and pathways to solve those. Through inputs on sustainability, participants' ability to act can increase (46). Furthermore, inspirational guest speeches can enhance participants' willingness and confidence to act (16). Since learning by doing is essential (47), experiencing and experimenting with the importance of sustainability has an impact on participants' willingness to act. Concrete exercises or tasks, optimally in the immediate work context, are thus recommended (16). In addition to this, the confidence to act can be influenced by gaining a more realistic perspective on the magnitude of self-perceived impact as well as by exchanging experiences with others. Especially receiving insights into the sustainable actions of others can create a sense of cooperation and strengthen participants' compassion (16).

To conclude, by developing action competence in professionals, organisations create change agents that can lead sustainability transitions (Figure 1).

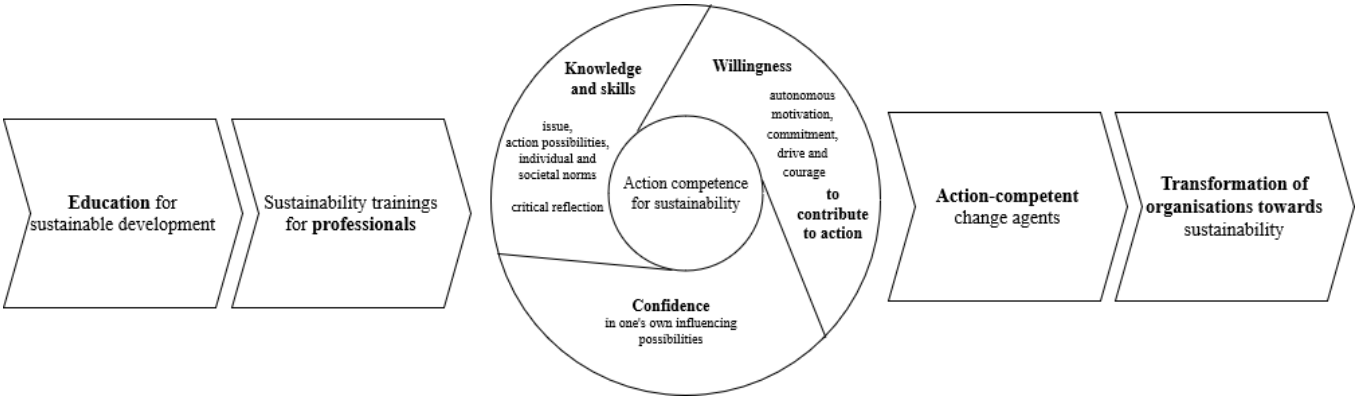


Figure 1: The role of education in sustainability transformations of organisations (own construction based on Sass et al., 2020)

However, the knowledge of how to effectively develop action competence in professionals for organisational purposes is still limited (16). Therefore, this study focuses on the question if and how training programmes can support the development of professionals' action competence.

3. METHODOLOGY

In the following section the methodological approach applied, including research context, research design, data collection, and data analysis, will be illustrated.

3.1 Research context

The subject of this study was a three-day training organised by VCF. Since the third training day was scheduled after the completion of this research, only two training days, held on March 28 and April 17, 2023, were included in this study. The participants of the training were 24 mid-level managers from public and private organisations of various sectors that are all members of VCF. Since eleven people followed the invitation to take part in the study, including one trainer, only these people were considered participants of the study (APPENDIX B).

3.2 Research design

In order to identify the individual development of the participants' action competence within the programme, a longitudinal study approach was taken (as adopted from Schröder et al. (16) and Piasentin et al. (34)). This research design is characterised by data that is collected on a sample, such as people or documents, on at least two occasions (48). Since the research is aiming for a better understanding of the participant's development over time, this approach is considered appropriate (10). In this study, the participants were asked twice to fill out the questionnaires: Before training day 1 and after training day 2. By making use of the same questionnaires the

researcher was able to study the self-perceived development of action competence in a quantitative manner while taking into account consistency (10). However, the study used both quantitative and qualitative techniques (48). Mixed-method strategies allow testing associations between variables with quantitative data while qualitative data serve to explain and generate novel constructs and relationships (49). Since the development of competence can be explored further, for example with regard to methods and means, the questionnaires only formed the basis for in-depth qualitative analysis. Therefore, after identifying the individual development of each participant quantitatively, the underlying processes were studied by conducting semi-structured interviews. This procedure provided the methodological fit and adequacy to answer the research question (50, 34, 51).

3.3 Data collection

The data for this paper was collected through the means of online and hard-copy questionnaires as well as semi-structured interviews. As online questionnaires allow easy access to the study subjects and have the advantage of low-cost and time-saving distribution (52), the researcher made use of Google Forms to create an online questionnaire. Since the response rate of 11 people can be considered rather low, the post-questionnaire was handed out on paper to minimise the risk of losing participants.

With regard to the design, the questionnaire made use of already-existent and validated scales (50, 53, 16). The resulting pre-questionnaire contained 20 statements regarding self-perceived action competence as well as sustainability performance. The response option used in the questionnaire is a five- and a ten-point Likert-type scale which leads to different competence scores. Due to the longitudinal nature of this research, Likert-type scales were useful to compare the pre-and post-questionnaire results (54). Furthermore, participants' organisation and names were collected to allocate pre-and post-questionnaires. To ensure confidentiality, the participants are presented using

pseudonyms in the following findings section. The post-questionnaire contained the same 20 statements plus two additional questions about overall satisfaction with the programme.

In addition, data was collected based on semi-structured interviews. By investigating participants' knowledge, experiences, or expectations (55), the study could derive important findings on setting up and improving sustainability trainings in the future. Providing "detail, depth and an insider's perspective" (56, p.665), semi-structured interviews make use of an interview guide while giving the participant some leeway in how to reply (48). The interview guide was derived from literature and the results of the questionnaire, and was kept the same from participant to participant to maintain consistency (48) except for questions referring to their individual scores in the questionnaires. Since the perspective of the trainer is different in comparison to the participants, the corresponding interview guide slightly differed.

By conducting the interviews after the second training day, the researcher was able to use the questionnaires' results and refer to them during the interviews. All interviews lasted approximately 40 minutes. Since the participating organisations are spread throughout the region, seven interviews were conducted online. However, previous studies provide evidence that the quality of data is as high as face-to-face interviews (57).

Collecting data always involves potential biases which occur along the process. To ensure validity and minimise the risk of literacy bias (48), the researcher tried to use simple English language in both questionnaires and interviews. Moreover, since the research topic is very susceptible to social desirability and the interviewer's confirmation bias (48), one pilot interview was carried out to minimise their occurrence in the interviews that followed.

In total, the researcher obtained eleven complete data sets, consisting of completed pre-and post-questionnaires and interview transcripts. Even though the depth of data differed within and across

the participants, the combination of questionnaires and interviews generated rich data providing in-depth insights into the participants' learning processes during the programme as well as the applied programme methods. To ensure the quality of this study, the researcher took the quality criteria of quantitative and qualitative research into account (48) and adhered to the ethical requirements of the University of Groningen.

3.4 Data analysis

First, the self-assessed pre-and post-questionnaires have been analysed and compared manually using Microsoft Excel. This allowed the researcher to make direct comparisons between the two questionnaires. The semi-structured interviews have been transcribed with Otter.ai and coded with Atlas.ti.

A combination of inductive and deductive coding approaches was followed. Therefore, concepts derived from literature, such as guest speakers as a tool to support action competence or critical thinking as an interrelated skill, have been used to code deductively. However, the researcher remained open-minded by looking for new patterns in the data, hence coded inductively as well.

To analyse the collected data, the qualitative content analysis from Mayring (58) was applied. Therefore, the researcher examined the text, taking into account the research question and aim. After starting with the codes derived from the literature, and adding new codes along the process, a moment of reviewing and adapting is of central importance (58). This took place after approximately 50 % of the data. The remaining other 50% of the data was then coded with the adapted coding structure. However, to build the final coding scheme, all the transcripts have been reviewed multiple times to ensure preciseness and correct allocations.

After identifying 47 relevant 1st order codes, these were summarised in nine more abstract codes (2nd order codes). Subsequently, the 2nd order codes were further abstracted into five aggregated

dimensions. The resulting coding scheme can be found in APPENDIX C. All the other resources used in data collection and analysis can be found in the shared folder.

4. FINDINGS

The following section contains the findings from both questionnaires and interviews. After describing the participants' development of action competence for sustainability within the training, the training design and impact as well as suggested improvements will be presented.

4.1 Development of action competence for sustainability

4.1.1 Effects on action competence for sustainability and sustainability performance. Overall, the comparative analysis of the pre-and post-questionnaires indicates only small changes among the eleven participants (Figure 2). Based on their answers, some participants developed their action competence (e.g. Participant 4), while others did not (e.g. Participant 1). However, while the ability and willingness to act remained roughly the same, the confidence to act has increased among all participants. In contrast, the sustainability performance has decreased by 0,9 points on average. These changes can be attributed to three factors (APPENDIX D), explained in the following.

Participant	Questionnaire	Ability to act		Conf. to act		Willing. to act		SP	
1	Pre	16	↓	15	→	19	↓	51	↓
	Post	12		15		16		49	
	Difference	**-4**		**0**		**-3**		**-2**	
2	Pre	15	→	13	↑	13	→	60	↘
	Post	15		16		13		59	
	Difference	**0**		**3**		**0**		**-1**	
3	Pre	18	↓	17	→	18	→	61	↓
	Post	15		17		18		56	
	Difference	**-3**		**0**		**0**		**-5**	
4	Pre	13	↑	13	→	16	→	60	↑
	Post	15		13		16		65	
	Difference	**2**		**0**		**0**		**5**	
5	Pre	12	↑	15	↗	14	→	52	↘
	Post	15		16		14		51	
	Difference	**3**		**1**		**0**		**-1**	
6	Pre	15	→	12	↘	14	→	55	↓
	Post	15		11		14		52	
	Difference	**0**		**-1**		**0**		**-3**	
7	Pre	15	→	16	↘	14	→	47	↓
	Post	15		15		14		43	
	Difference	**0**		**-1**		**0**		**-4**	
8	Pre	20	↓	20	→	20	→	68	↓
	Post	18		20		20		66	
	Difference	**-2**		**0**		**0**		**-2**	
9	Pre	16	↗	17	↘	16	↘	67	↓
	Post	17		16		15		56	
	Difference	**1**		**-1**		**-1**		**-11**	
10	Pre	14	↓	10	↑	17	↓	48	↑
	Post	12		16		14		54	
	Difference	**-2**		**6**		**-3**		**6**	
11	Pre	16	→	16	↑	16	↗	49	↑
	Post	16		18		17		57	
	Difference	**0**		**2**		**1**		**8**	
Total average	Pre	15,5	↘	14,9	↗	16,1	↘	56,2	↘
	Post	15		15,7		15,5		55,3	
	Difference	**-0,5**		**0,82**		**-0,5**		**-0,9**	

Figure 2: Summary of training effects on participants' action competence for sustainability, represented by its subcomponents and sustainability performance (SP). Arrows indicate change based on interpretation of the data (Pre/ Post +/- 0 = arrow demonstrates no development; Pre/Post +/- 1 = arrow demonstrates positive/negative tendency; Pre/Post +/- 2 or more = arrow demonstrates positive/negative development). The coloured pre-and post-cells indicate scores before and after the training (score 20-17 / 80-63: high; score 16-13 / 64-49: rather high; score 12-8 / 48-33: medium; score 7-5 / 32-17: rather low; score 4-0 / 16-0: low)

4.1.1.1 Effects due to personal development. The central factor which affected the participants' action competence is their personal development during the training. Even though the

development is dependent on who is attending the training (Participant 2), there were aspects which influenced the action competence positively as well as negatively.

To start, the self-perceived action competence was developed through the knowledge gained during both training days. Participant 5 highlighted that he got *"some really excellent suggestions"* that will help him get more circularity into the company's DNA. Paired with higher belief in their own competence, the ability to act and/or the sustainability performance scores increased (Participants 4, 5, 9 and 10). Furthermore, six participants reported that the training raised their awareness of sustainability and circularity and initiated change in both private and work life. For example, Participant 6 stated that *"this kind of sessions do make [him] a little bit more aware about potential. Potential to change"*. Confirming, Participant 10 became more aware of the urgency of the topic. In sum, raising awareness and seeing the need for change affected the participant's confidence to act positively. With regard to willingness to act, the training had a positive impact on the participants' enthusiasm. Specifically, Participants 3, 4 and 10 pointed out that the training increased their motivation and helped them *"getting some new energy"* (Participant 4). Also, Participant 11 stated that his willingness to act increased. Before the training he *"was driven by targets"* only, while he is now (after training day 2) aware that *"it (the business model and sustainability) needs to go hand-in-hand".* Another aspect which is considered to be a driver of willingness to act as well as sustainability performance is the involvement of others. The process of understanding whom to involve to create change (Participant 5) and getting them on board successfully (Participants 7, 9 and 11) were reasons for higher scores after the training.

Few participants also distinguished between work and private life when answering the questionnaires. Participant 5 said for example that he is not always *"thinking about actions to*

improve" in his private life, while at work this topic is very much part of the strategic agenda. The inclusion of both private and work life leads to rather neutral results in the questionnaires.

Participants also reported on aspects which affected their results negatively. One of these aspects is frustration due to slow progress. Participant 1 made this clear by saying:

> *"I'm convinced that I can make a difference sometimes, […], with the colleagues from my company and with everybody, including this program[…]. And sometimes, I think, yes, it's going so slow. And […] can I do something about it? You know, that's a little bit of doubt that's in there, but we have also discussed [this] in the workshop. That's a psychology about it. It's very, also in my mind."*

Additionally, engagement in sustainability also takes a lot of energy which makes participants less willing to act sometimes (Participant 1). Moreover, two participants (4 and 8) reported that they have a personal challenge sometimes in being confident about their own knowledge. Resulting in self-doubts, this was considered to be a reason for a lower confidence to act score.

4.1.1.2 Effects due to external factors. The perception of one's action competence is also affected by others or by the context within which a person is situated. Since the training was followed by persons with very different levels of sustainability, participants realised they have higher or lower experience with the topic compared to the others. This resulted in both, higher and lower ability and confidence to act scores after the second training day. This can be seen especially in the results of Participants 1 and 8 who rated themselves lower after the second training day. Participant 1 illustrated: *"If I see the other persons in the group, I know less".* In contrast, Participant 3 realised during the training that he and his organisation act as a forerunner which made him more confident. However, this became not clear by his questionnaire results, but by talking to him.

The external surroundings also influence the self-perceived action competence. Regarding the professional role, Participant 4 explained that the current market situation makes it very challenging to reach the set targets. Surrounded by these circumstances, she does not *"feel very confident, that [she] is the one who's going to solve [the challenge]".* In her private life, Participant 1 stated that attitudes and activities from friends and family influence her confidence and willingness to act. Especially in the past weeks, Participant 1 felt like her *"surrounding is not really enthusiastic"* about sustainability which made her feel less confident and willing sometimes since it takes *"too much energy to always have that enthusiasm".* This resulted in lower scores in willingness to act after training day 2. Finally, the statements on the perceived influence on global development (Questionnaire statements 5, 8, 10 and 11) were negatively assessed by seven participants. Participant 7 stated, for example, that *"it's too big to be able to do something about changing our society"*. Participant 3 added to this by saying that he is not sure whether he has an influence on a global level. In sum, some participants rated the aforementioned statements which were linked to their confidence and willingness to act on global sustainable development lower.

4.1.1.3 Effects due to own role. Lastly, the current role also affected the action competence for sustainability. Participants 2, 9 and 11 expressed that their management position within the organisation makes them able to act sustainably. When having the influence and the power, the ability to act is given. Participant 9 emphasised this by stating that he has the "*ability to put more pressure on it*". Furthermore, the type of organisation can have an influence on the perceived ability to act. Participant 10 stated that, as a governmental body, *"we must set an example"*.

4.1.2 Effects on critical thinking skills. The interview questions covered both the perceived relevance of critical thinking for being action-competent as well as the individual critical thinking skill development during the training. Participants 2, 4, 6, and 9 reflected that they see critical

thinking as a relevant skill related to action competence for sustainability. Due to the diverse backgrounds of the participants, different perspectives enriched discussions within the training. Eventually, this resulted in higher critical thinking skills. Moreover, being able to ask (critical) questions is mentioned to be essential since it helps to *"discover what you don't know"* (Participant 6) and to consider all relevant aspects before actually taking action (Participant 4).

Critical thinking is also considered to be a barrier. According to Participants 4 and 5, by opening up multiple possible solutions, decision processes can be slowed down. Moreover, three participants were more sceptical in terms of (their) critical thinking development. Participant 4, for example, said that the training was more about the content, not including critical thinking development necessarily. The other two Participants (3 and 5) considered themselves as already highly skilled in critical thinking since it is *"the thing [they] do all day"* (Participant 5). The training, therefore, did not influence their critical thinking ability.

4.2 Training design and impact

4.2.1 Tools and methods. Considering the research aim, the question arose which of the applied training tools and methods are important to support the development of action competence for sustainability. To start, the location was changing from one training day to the other. Considered as a tool, three participants (1, 3 and 8) valued the first location in particular, being a great place to work in, filled with creativity and energy. Therefore, the trainers took this as an opportunity to start the training with a guest lecture about the planning and development of the building. The presentation was considered to be very inspirational for the participants which also resulted in triggering action: *"A few ways of how he (the guest speaker) started the conversation with the company, I wrote down as a reminder. Maybe those are good ways of trying to evolve the company"* (Participant 5). The other two guest speeches (APPENDIX E) were also valued as highly beneficial,

as they contained not only success stories but also challenges and insights into how they tackled those. In general, sharing experiences and challenges is mentioned to be one of the central advantages of this training as it allows to exchange ideas and support each other (Participants 2, 4, 5, 7-9).

Second, the trainers presented the Seven Pillars model of VCF. This model (APPENDIX F) presents seven characteristics of a circular economy, namely (I) sustainable energy supply, (II) sustainable water extraction, (III) support of biodiversity, (IV) cultural diversity, (V) support of health and wellbeing, (VI) creation of added value, and (VII) high-quality recyclable materials. Seen as a strategy when building a circular system (Participant 1), the trainers presented this model and thereby provided a structure of how to approach circularity. Participants 4, 7, and 9 reported that this model helped them because they can link it to their own sustainable strategy, either setting it up from scratch or improving it further.

Third, the training also provided room for discussion. Although the group composition was very diverse, some participants realised in discussions with others that they face the same or similar problems. Participant 4 highlighted the value of discussions by saying that *[…] "for me, it was more valuable to know that other companies struggle with the same issues".* Adding to this, Participant 3 realised that discussions allow a *"deep dive [into] the content".*

Fourth, the trainers introduced the so-called action plan (APPENDIX G). The action plan consists of nine steps divided into four parts – plan, do, act, check – and includes the definition of the scope, the planning of possible steps, and the acting itself. Even though the plan was not new to everyone, seven participants considered the action plan as helpful as it provides structure and guidance on the way towards circularity. Especially when there is a lot of information, Participant 4 said this tool has helped her to *"organise things in [her] head".* Moreover, the action plan functioned as a frame

since the training participants got to know it on training day 1, worked with it on training day 2 and will be presenting it on training day 3. Even after the training, as Participant 2 stated it, *"you have a deliverable, you have something".*

4.2.2 Training effects and takeaways. Besides the comparisons of the questionnaires, there were also more general effects of the training found during the interviews. First, the training strengthened participants' enthusiasm and knowledge about sustainability and circularity (Participants 6-8). Consequently, this also affected the mindset of some participants. As Participant 11 said, *"the first workshop changed my mind".* In contrast, only one participant (11) stated that the training *"will not influence [his] vision on sustainability"* since he is already working on it on a daily basis. More generally, seeing the development of action competence as a continuous process, Participant 8 stated that *"if you're attending trainings and workshops more often, it will help you keeping an open mind, also in approaching different problems."*

The participants also reported on some takeaways. Apart from new contacts for their network, Participants 5, 6, 7, and 9 highlighted that they received a lot of valuable tips and recommendations that they will use in the future. For Participant 5, it became clear how to get started and how to get more people involved since this was his biggest challenge so far. Moreover, three participants (3, 7, 9) stated that they will practice the application of the learned methods in their future work. Three participants also mentioned that they want to *"bring (topics) to the table"* (Participant 11), either in their teams or in collaboration with other departments (Participants 4, 5 and 11).

4.2.3 Resulting sustainable actions. The training also initiated some immediate sustainable actions. Participant 6, for example, stated that *"after the last session (training day 2), when they were talking about using less garbage in an office, dust bins I mean, […] I removed my dust bin from my office"*. In addition to that, Participant 9 set up a meeting in between both trainings to put

the topic on the company's agenda. With this meeting, he wanted to express his intention to involve more people in the company's sustainability ambitions. Another participant (11) arranged a meeting for the week after training day 2. In this meeting, he will *"discuss the first three months with [the] team and get some new goals"* while also reporting on the topic of sustainability itself.

4.3 Training limitations and suggested improvements

There were also training limitations mentioned in the interviews. The first aspect which was considered relevant is the insufficient time allocated to discuss the action plan. Four participants (3, 7-9) said that they would have needed more time to discuss their challenges. Participant 8 elaborated on it by saying: *"It would have been nice to […] discuss "what we're going to do" [or] "what works best in your organisation", that there's a bit more time to share best practices".* Confirming, the trainer also rated the time for discussing the action plan in groups as too short (Participant 1). Consequently, it would be reasonable to plan more time for it the next time. Secondly, the composition of the group was reflected in the interviews. Participants 6 and 11, both working for profit-driven companies, stated that *"the issues and challenges are quite different"* between private and public organisations. For future trainings, it would be beneficial to have *"a little bit more balanced field of contestants"* (Participant 6), meaning the ratio of private and public organisations as well as the business model (service-based or product-based). In addition to that, one participant (7) mentioned the gap between the participants about their sustainability knowledge levels. Considering herself a beginner, she recommended that more attention should be paid to ensuring that the levels of the participants are similar. Thirdly, one participant evaluated some of the topics discussed in the training as too small scale, such as how to replace single-use coffee cups. Instead, he would rather suggest that each organisation ask themselves *"What's [our] biggest impact on society? […] And how are [we] going to change that?"* (Participant 2) and bring this

challenge to the training. Lastly, one participant (2) recognised that in this kind of training *"there's a lot of talking, but not a lot of doing".* Consequently, concrete steps and appointments for the future would be helpful to link training learnings with day-to-day business.

5. DISCUSSION

To answer the research question *How can training programmes for professionals support the participant's development of action competence for sustainability,* the derived findings will be now discussed taking into account the initially described academic literature.

5.1 Development of action competence for sustainability by attending the training

Overall, the findings do not indicate big changes in participants' ability and willingness to act sustainably as well as in sustainability performance before and after the training. Only the confidence to act sustainably has increased for the majority of the participants which is in line with previous studies (16, 34). Although the development is not significant according to the numbers, the interviews revealed that immediate sustainable actions followed during and after the training. Resulting in changing one's behaviour, initiating meetings or activating others, it becomes clear that the training successfully triggered participants to take action in their immediate work context. Since experiencing sustainable action is seen to be the result of being action-competent and even strengthening the action competence further (59), the findings can be seen as highly valuable.

5.2 Promotion and prevention of action competence development

The promotion and prevention of action competence development will now be discussed by returning to the framework from Eames et al. (36). Overall, the findings contributed to five of the six key processes needed to develop action competence.

In order to develop knowledge and understanding of both conceptual and practical sustainability issues (I), theory suggests combining content with reflective learning approaches (34). By providing theoretical knowledge in the form of giving presentations, covering topics such as the Seven Pillars of circular economy, while asking questions to invite the participants to actively contribute to the debate, the training fulfilled this demand. Consequently, the training increased the participants' ability to act, as proposed in the literature (46). Furthermore, the development of critical thinking has been discussed in the interviews. Confirming the theory (37, 33), four participants considered critical thinking as an important skill related to action competence. Thanks to the training design, the same participants reflected that they improved their critical thinking skills.

To develop a vision for a sustainable future and explore alternatives for change (II), the literature proposes to have guest speakers to increase individuals' willingness as well as the confidence to act and encourage imitation (16, 34). Considered *"really inspiring*" (Participant 7) as well as *"open and transparent"* (Participant 8), the study's findings confirm that. In general, getting insights into sustainable actions and challenges of others, in both guest speeches or discussions, *"shaped a bond"* (Participant 4) among the participants and helped them to get more involved with the topic.

Developing individuals to think systematically (III) can be supported by aiming for interdisciplinarity (39). Since the training consisted of planned group work and exchange among the participants, interdisciplinarity can be seen as promoted. Additionally, Participant 8 stated that the training *"opened [her] view […] to how many different views […] and how many different ways of approaching issues [there are]".* Thereby, the training promoted the adoption of different perspectives, hence system thinking.

To develop the ability to plan and a willingness to take effective action (IV) as well as to gain experiences (V), practical exercises are mentioned to be helpful to grasp the complex topic of sustainability and to strengthen confidence. Moreover, action-planning skills should be promoted (34, 16). In the training, the trainers used a specific method to enhance these skills: the action plan. Evaluated as very useful by the participants, Schröder et al. (16) and Martínez et al. (33) confirm that concrete tasks in the real-life context are helpful to increase participants' willingness to act. However, the action plan is not directly linked to a higher willingness to act, at least this cannot be seen in the questionnaire results.

The last process is characterised by developing critical reflection abilities (VI). In fact, this was not promoted within the training. The reason for this is that the aim of the training was not explicitly to develop action competence but to develop a strategy to make business operations more circular. However, the researcher observed that, during the interviews, some participants started to think about their progress and thereby reflected indirectly.

The research also generated some additional insights, not considered in previous literature, about the factors influencing action competence development. First, it stands out that the participants measure their competence by comparing themselves with others. This resulted in both negative and positive effects on participants' ability and confidence to act scores. Group composition played a crucial role, with participants having diverse job roles and knowledge levels on sustainability. Consequently, it is reasonable that some gained significant knowledge while others only learned little. The perception of this has been, however, very different. While Participant 7 stated that it *"should be better if the group is more on the same level"*, Participant 3 fully accepted his role as a forerunner and stated that he wants to help others now. By improving his knowledge further, also by understanding the challenges of others, he believes in collective action in the future. According

to him, *"this is the road to success".* Moreover, the participants have very different roles within their organisations. It became clear that the higher the position of the person, the higher the perceived ability to act.

Second, action competence is also influenced by external factors which are not directly related to the training. Besides the possible negative influence of friends and family or difficult market situations, which can result in both decrease in confidence to act and sustainability performance, the perceived impact on global sustainable development is highly recognisable in the scores. While some participants considered their willingness to act on a global level very fluctuating, others did not believe in their influence on the global level, resulting in lower confidence to act scores.

5.3 Recommendations for future training programmes

Considering all the aforementioned aspects, the question arises of how future training programmes should look to best promote change agents in their action competence development. Taking into account the three factors which influence the action competence development, a future programme should be based on three pillars: the conscientious planning, the programme design, and the check-out.

The *planning* entails the decision on the group composition. As the findings have shown, different starting levels can bring advantages and disadvantages which should be carefully weighed. Moreover, it is important to consider in which ratio public and private organisations should be taking part since it lays the foundation for discussions. Second, the *training design* should be developed wisely. This involves (I) providing knowledge about sustainability, also including guest speakers, (II) stimulating interaction among the participants through group work or discussions, and (III) the use of practical exercises. Especially experimenting and experiencing the topic of sustainability or circularity is of crucial importance as it is proven by this research. Importantly,

enough time should be allocated to maximise the outcome. Third, the programme concept should include the definition of follow-up steps. Indirectly incorporated within the action plan, this will be proven in training day 3. Moreover, the *check-out* also provides room for self-reflection. Even though self-reflection was not considered in the training, previous studies suggest it to be an essential element (16, 2). Especially with regard to the influence of friends and family as well as the perceived influence on global sustainable development, reflection could enhance future training concepts.

To conclude, taking into account both the three factors which affect action competence development and the three pillars for future training is of crucial importance when developing action-competent change agents and thereby contribute to the transformation of organisations towards sustainability (Figure 3).

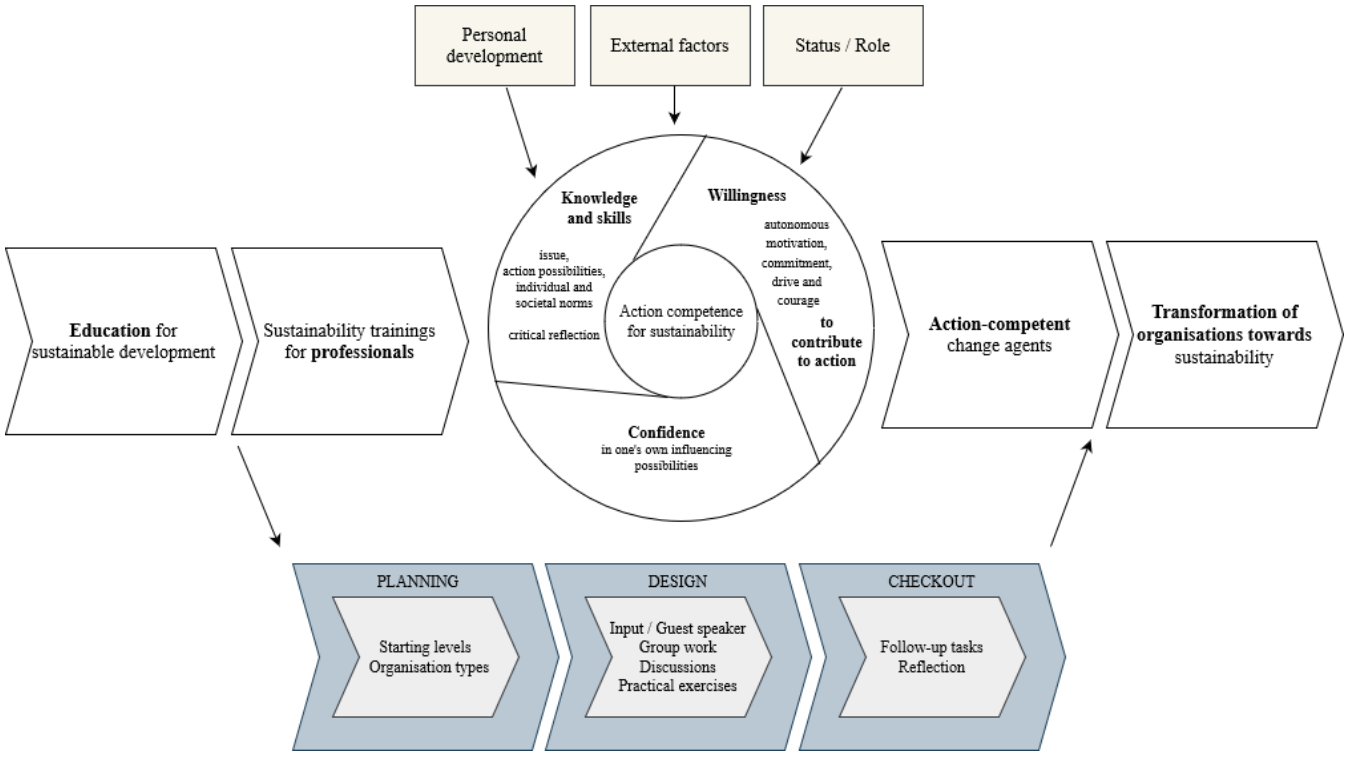


Figure 3: The role of education in sustainability transformations of organisations adjusted by the factors influencing the action competence development and extended by three pillars necessary for future training programmes (own construction based on Sass et al., 2020)

6. CONCLUSION

As the concept of ESD proposes, the education of individuals should be action-oriented, trans-and interdisciplinary as well as collaborative and participatory (9). By bringing together professionals from various backgrounds, initiating discussions among them and letting them work on a concrete task, the studied training fulfilled this endeavour and clearly showed that training programmes "can, and must, contribute to a new vision of sustainable global development" (9, p.7). Specifically aiming to shed light on the development of change agents, this study adds to the academic discourse by bringing forward three main conclusions. First, action competence and its development are influenced by three factors: (I) the personal development within a workshop such as becoming aware of the topic or gaining knowledge, (II) the external surroundings including other participants, and (III) the position or role in which one is acting. Second, every training concept aiming to foster action competence for sustainability should incorporate content and interactive elements as well as concrete practical exercises, suitable to the individual work context. Third, the planning and end of a training are essential for the training's success: While the wisely chosen composition of the group has an influence on both, individual competence perception as well as the group dynamic, follow-up tasks and reflection impulses ensure that participants pursue in their personal development and take action. In addition to the academic discourse contribution, this study also provides guidance for practitioners, such as organisations or training facilitators, by proposing a new training programme model (Figure 3).

6.1 Limitations

This study has also limitations. The first aspect which should be considered is the timing of the training programme. Even though it can be considered a longitudinal study, the time span between the two training days is rather short. This is why a significant change of action competence was not

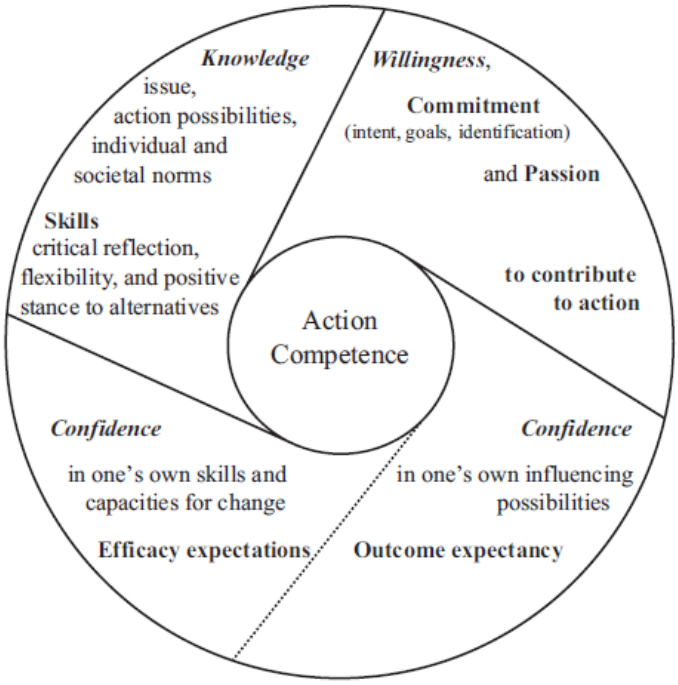
expected beforehand (Participant 2) and was confirmed by the findings. Consequently, the consideration of all training days would have better reflected the overall programme and its effect on the participants. Secondly, some participants reported that filling in the questionnaire is always a snapshot of a given mood and atmosphere, and therefore can produce different competence scores. In addition, four of the eleven participants only attended one training day. Eventually, both aspects limit the significance of the results. However, after having analysed the individual results, it becomes clear that only attending once did not reduce the development of the participants. Lastly, all the participants have chosen themselves to be part of this study. Thereby, the risk of self-selection bias needs to be considered.

6.2 Future research

The study provides ground for future research. Since the study duration was rather short, future research could prove the presented results with a replicated study over a longer period of time, using the same questionnaires. Since the development of competence may take some time, future research could elaborate on that specifically. Both could entail the testing of the future training programme model developed in this study. Second, critical thinking was also mentioned to pose a hurdle in taking action. Future research could follow up on this and study the role of critical thinking and its possible effects on the development of action competence in detail. Another aspect which was not included in the study is the role of the trainers. Their impact on participants' development could also be an interesting approach for future research. Lastly, the training was carried out with a very heterogeneous group of people. It could be interesting to study to what extent the results would differ if such training would be carried out in one organisation only. Since the group composition and the comparison with others had such an influence on the self-perceived action competence, an internal training could extend the state of literature.

APPENDIX

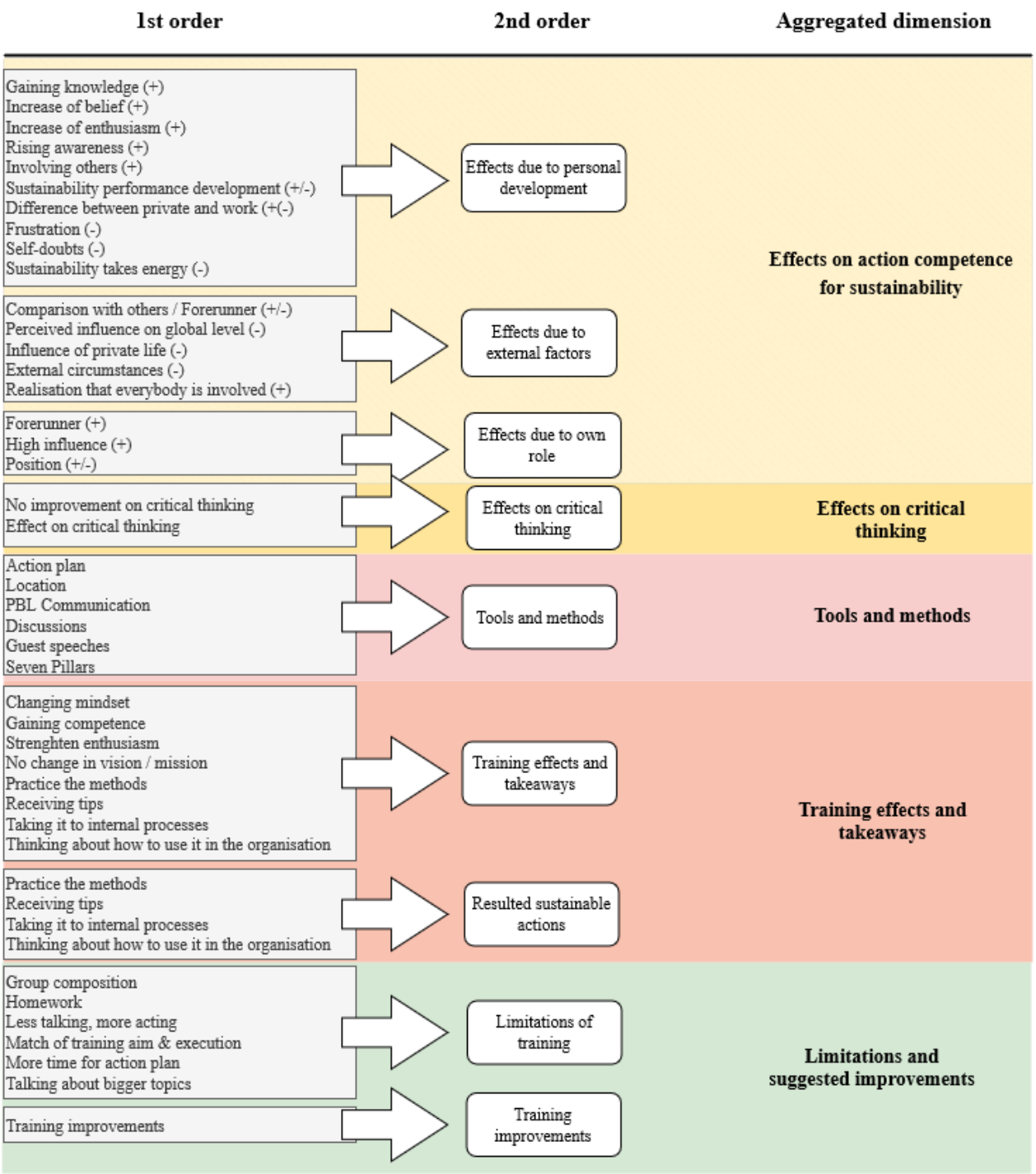
APPENDIX A: Features of an action-competence individual (Sass et. al, 2020, p.20)



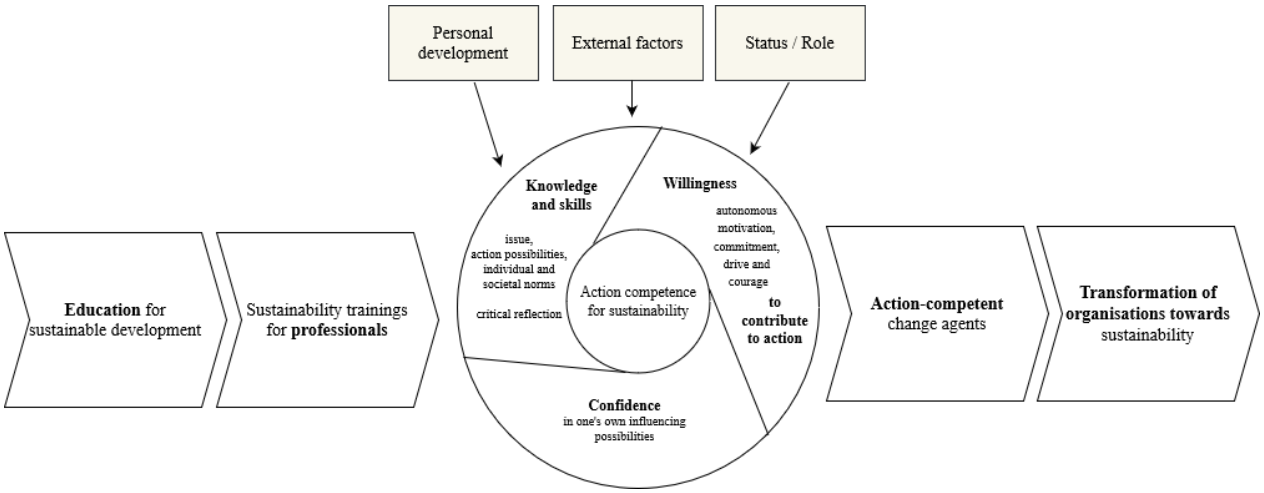
APPENDIX B: Participants of the study

Participant	Public / Private organisation	Sector / Industry	Job title	Attendance Training Day 1	Attendance Training Day 2
1	Private	Consultancy	Project Manager Mobility & Infrastructure	Hosting	Hosting
2	Private	Chemicals	Operations Manager	Yes	Yes
3	Private / Public	Waste / Public services	Purchaser Recycling	Yes	Yes
4	Private / Public	Public transport	Sustainability Manager	No	Yes
5	Private	Manufacturing	Team Lead R&D	Yes	Yes
6	Private	Logistics	Supply Chain Manager	Yes	Yes
7	Public	Social Services	Business Controller	No	Yes
8	Public	Education	Sustainability Coordinator	Yes	Yes
9	Private	Logistics	General Manager	Yes	Yes
10	Public	Government	Team Lead Facility Management	Yes	No
11	Private	Manufacturing	Inside Sales Manager	Yes	No

APPENDIX C: Coding scheme (own visualisation)



APPENDIX D: The role of education in sustainability transformations of organisations adjusted by the factors influencing the action competence development (own construction based on Sass et al., 2020)



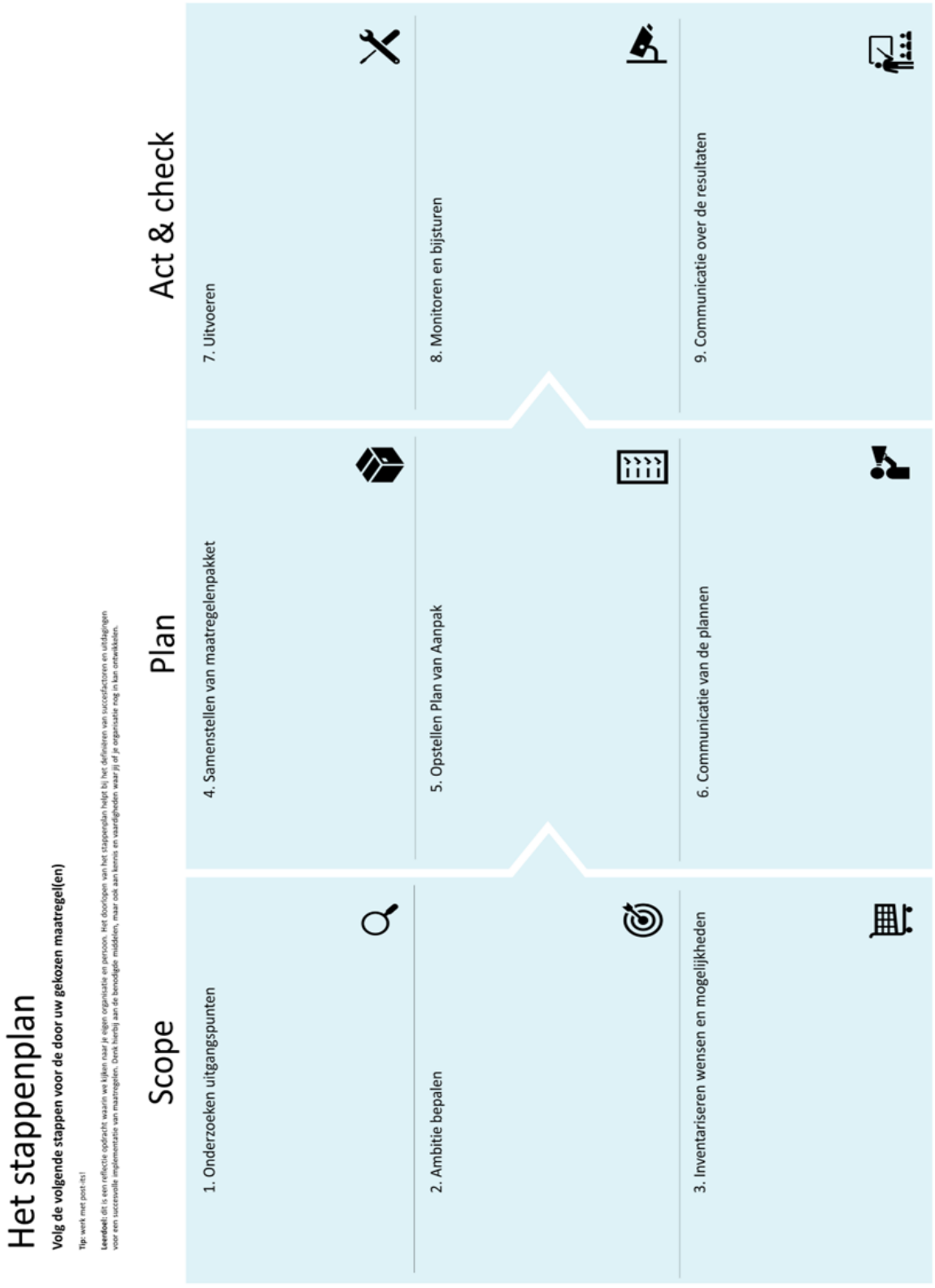
APPENDIX E: Relevant tools and methods applied in the training (own visualisation)

Tool	**Content**	**Presented by**	**Date**
(I) Guest speeches:			
1. De Stek Building	Presentation about the construction of the shared office building including its involvement of various stakeholders and today's use of the building	External speaker from the consultancy company	28.03.23
2. NHL Stenden / Green Wave	Presentation about the Green Wave initiative within the university	Participant 8	17.04.23
3. Circular Purchase	Presentation about the circular purchase of a waste management company including pitfalls	Participant 3	17.04.23
(II) Seven Pillars (VCF)	Presentation about the Seven Pillars model of VCF	VCF & Trainers	28.03.23/ 17.04.23

(III)	Discussions	Discussions in between the presentations held by the trainers; exemplary topics: psychological aspects of involving others, circular coffee cups, filling in the action plan	All	28.03.23/ 17.04.23
(IV)	Action plan	Presentation and introduction of the action plan worksheet developed by the consultancy company	Trainers	17.04.23

APPENDIX F: 7 Pillars of a circular economy (VCF, 2023)

APPENDIX G: The action plan (developed by the consultancy firm)



APPENDIX H: Overview of the files in the shared folder

File	Content
1	Informed consent
2	Information sheet
3	Ethics checklist
4	Pre-questionnaire
5	Post-questionnaire
6	Analysis of the questionnaires
7	Interview guides
8 (folder)	Interview transcripts and signed consent
9	Code overview (with exemplary quotes)
10 (folder)	Training presentations

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